

REMARKS

Claims 1, 16, 24, 25, 26, 27, 28, 29, 30, 32, 33, 35, 36, 45, 50, 54, 58, 59, 63 and 64 have been amended.

Claims 1 - 68 are present in the subject application.

In the Office Action dated March 18, 2005, the Examiner has objected to claims 12 - 15, 26 - 29, 41 - 44 and 49 - 53 as being dependent upon a rejected base claim, has rejected claims 1 - 11, 16 - 25, 30 - 35 and 54 - 68 under 35 U.S.C. §102(e), and has rejected claims 36 - 40 and 45 - 48 under 35 U.S.C. §103(a). Favorable reconsideration of the subject application is respectfully requested in view of the following remarks.

The Examiner has rejected claims 1 - 11, 16 - 25, 30 - 35, and 54 - 68 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,130,881 (Stiller et al.). Briefly, the present invention is directed toward facilitating configuration of or cluster formation within a communications network by utilizing network topology information. Network nodes that are crucial for relaying traffic are designated as cluster head nodes or routing nodes, while remaining network nodes are designated as member nodes. The transmission rate for transmitting a beacon packet by a network node or the interval between successive beacon packet transmissions by that node is adjusted by the present invention to facilitate cluster formation or network configuration independent of network size and varying initial start times of network nodes. In addition, the present invention utilizes the above described cluster formation technique to form a three-tier architecture for transmission or flooding of routing information throughout the network. The cluster formation technique is applied to cluster head nodes to form an additional network tier of super nodes that

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distribute routing information, while cluster head nodes route network data traffic.

The Examiner takes the position that the Stiller et al. patent discloses all the features within these claims.

This rejection is respectfully traversed. However, in order to expedite prosecution of the subject application, independent claims 1, 16, 30, 33, 54, 59 and 64 have been amended to further clarify the features of the present invention. In particular, independent claims 1 and 16 have been amended and recite the features of: examining network connectivity information and identifying neighboring units of the communication unit that are isolated from communications with remaining neighboring units of the communication unit; designating the communication unit as a routing unit in response to determining that the communication unit communicates with at least one isolated neighboring unit, wherein the communication unit designation as a routing unit is fixed for routing subsequent network messages; and reevaluating the communication unit designation in response to connectivity changes in the network. Independent claims 30 and 33 have been amended and recite the features of: facilitating periodic transmission of a unit status message; adjusting the time between each periodic transmission in response to detecting modifications in connectivity with neighboring units; and determining a status of the communication unit as a routing unit in accordance with information contained within received unit status messages, wherein the communication unit status as a routing unit is fixed for routing subsequent network messages and reevaluated in response to changes in network connectivity. Independent claims 54, 59 and 64 have been amended and recite the features of: examining network connectivity information and identifying at least one neighboring unit that is required to utilize the communication unit to

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communicate with network communication units that are outside the range of and greater than one hop away from the neighboring unit; designating the communication unit as a relay unit based on the examination and in response to determining that at least one neighboring communication unit is required to utilize the communication unit for communications, wherein the communication unit designation as a relay unit is fixed for transferring subsequent network messages; and reevaluating the communication unit designation in response to connectivity changes in the network. Dependent claims 24 - 29, 32, 35, 58 and 63 have been amended for consistency with their amended parent claims.

The Stiller et al. patent does not disclose, teach or suggest these features. Rather, the Stiller et al. patent discloses a method of transmitting a message from a source node to a destination node in a small, wireless network having up to N nodes in which each message has appended thereto concise network configuration data which eliminates the need for routing protocols without adding significant overhead to the network communications. The method includes the steps of creating for each node a route table containing a count of the number of transmission hops necessary to reach each destination node and a node number of a neighboring node forming a next link in a chain of hops to each destination node, where the node number identifies a unique bit in an N-bit address mask. Routing data is appended to the message data which includes an N-bit destination word identifying the destination node or nodes, an N-bit route word including a logical OR of the address mask of the relay node or nodes, and a route update message identifying what the current node knows about the network configuration (e.g., See Abstract).

Initially, the transmitter of a received message is identified and the routing data for the

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message is extracted from the received message. Nodes receiving the message update their routing tables irrespective of whether or not the message was addressed to that node. A node determines if the message was intended for the current node by taking a logical AND of the destination node specified in the received routing data and the node mask for the current node. If the current node is a destination node, the received message data is processed (e.g., See Column 7, lines 31 - 35 and 38 - 47). The node may also take a logical AND of the route word specified in the received routing data and the node mask for the current node. If the current node is determined to be a relay node, the received message data is given routing data and passed to the transmitter for retransmission. (e.g., See column 7, lines 51 - 60).

Thus, the Stiller et al. patent discloses network nodes whose function as relay nodes depends on the information in a received message indicating a message routing path. In other words, the Stiller et al. patent nodes function as (or have a status of) relay nodes in response to being within a routing path of a received message. There is no disclosure, teaching or suggestion of examining network connectivity information and identifying neighboring units of a communication unit that are isolated from communications with remaining neighboring units and designating the communication unit as a routing unit in response to determining that the communication unit communicates with at least one isolated neighboring unit as recited in independent claims 1, 16, 54, 59 and 64.

In addition, since the relay functions or status of the nodes of the Stiller et al. patent depend upon the particular routing path between source and destination nodes, the node function or status can change with different message routing paths. In contrast, independent claims 1, 16, 30, 33, 54, 59 and 64 recite the features of the communication unit designation as a routing unit being fixed for

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subsequent network messages and reevaluating the designation in response to connectivity changes in the network. In other words, the designation of a communication unit as a routing unit is fixed (and independent of the routing paths) until the network connectivity changes to trigger a re-evaluation of the designation.

Although the Stiller et al. patent discloses transmission of periodic keep alive route messages (e.g., See Column 11, lines 9 – 12), there is no disclosure, teaching or suggesting of adjusting the time between periodic transmission of status messages in response to detecting modifications in connectivity with neighboring units as recited in independent claims 30 and 33.

Since the Stiller et al. patent does not disclose, teach or suggest the features recited in independent claims 1, 16, 30, 33, 54, 59 and 64 as discussed above, these claims are considered to be in condition for allowance.

Claims 2 – 15, 17 – 29, 31 – 35, 55 – 58, 60 – 63 and 65 – 68 depend, either directly or indirectly, from independent claims 1, 16, 30, 33, 54, 59 or 64, and therefore, include all the limitations of their parent claims. These dependent claims are considered to be in condition for allowance for substantially the same reasons discussed above in relation to their parent claims and for further limitations recited in the dependent claims.

The Examiner has rejected claims 36 – 40 and 45 – 48 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,130,881 (Stiller et al.) in view of U.S. Patent No. 6,370,571 (Medin, Jr.). Briefly, the present invention is directed toward configuration of a communications network by utilizing network topology information as described above.

The Examiner takes the position that the Stiller et al. patent discloses all the features within

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these claims except for a communication unit designated as a transmission routing unit to form a third network tier to transmit network information throughout the second and third network tiers. The Examiner further alleges that the Medin, Jr. patent discloses these features and that it would have been obvious to combine the Stiller et al. and Medin, Jr. patents to attain the claimed invention.

This rejection is respectfully traversed. However, in order to expedite prosecution of the subject application, independent claims 36 and 45 have been amended to further clarify the features of the present invention. In particular, independent claims 36 and 45 have been amended and recite the features of: determining the status of the communication unit as a routing unit of the second network tier for routing network traffic or as a member unit of the first network tier and associated with a routing unit, wherein the communication unit status as a routing unit is fixed for routing subsequent network messages; determining the status of the communication unit as a transmission routing unit in response to the communication unit being designated as a routing unit, wherein the communication unit status as a transmission routing unit is fixed for flooding subsequent network connectivity messages; and reevaluating the communication unit status in response to connectivity changes in the network.

The Stiller et al. patent does not disclose, teach, or suggest these features. As discussed above, the Stiller et al. patent discloses a method of transmitting a message from a source node to a destination node in a small, wireless network having up to N nodes in which each message has appended thereto concise network configuration data which eliminates the need for routing protocols without adding significant overhead to the network communications. The Stiller et al. patent discloses a flat (single-tier) network (e.g., See Fig. 1), where the functions of the nodes as relay

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nodes are based on routing information received by that node as described above. Thus, the Stiller et al. patent does not disclose, teach, or suggest a first network tier of member units, a second network tier of routing units, and a third network tier of routing transmission units as recited in the claims. Further, functions or status of the nodes of the Stiller et al. patent as relay nodes depend upon the routing paths between source and destination nodes and change with differing routing paths as described above. In contrast, independent claims 36 and 45 recite the features of the communication unit status as a routing unit or a transmission routing unit being fixed for subsequent network messages and reevaluated in response to connectivity changes in the network. In other words, the designation of a communication unit as a routing unit or transmission routing unit is fixed (and independent of the routing paths) until the network connectivity changes to trigger a re-evaluation of the designation. Accordingly, the Stiller et al. patent does not disclose, teach or suggest the features recited in independent claims 36 and 45.

The Medin, Jr. et al. patent does not compensate for the deficiencies of the Stiller et al. patent and similarly does not disclose, teach, or suggest the above discussed features. Rather, the Medin, Jr. patent discloses a scalable, hierarchical, distributed network architecture and processes for the delivery of high performance, end-to-end online multimedia services, including Internet services such as World Wide Web access (e.g., See Abstract), and is merely utilized by the Examiner to show a three tier network. Since this type of architecture is typically static, there is no dynamic re-evaluation of unit designation based on network connectivity changes as recited in the claims.

Since the Stiller et al. and Medin, Jr. patents do not disclose, teach or suggest, either alone or in combination, the features recited in independent claims 36 and 45 as discussed above, these

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claims are considered to be in condition for allowance.


Claims 37 – 44 and 46 – 53, depend, either directly or indirectly, from independent claims 36 or 45 and, therefore, include all the limitations of their parent claims. Dependent claim 50 has been amended for consistency with its amended parent claim. These dependent claims are considered to be in condition for allowance for substantially the same reasons discussed above in relation to their parent claims and for further limitations recited in the dependent claims.

In addition to the foregoing, there is no apparent reason or motivation to combine the teachings of the Stiller et al. and Medin, Jr. patents. In particular, the Stiller et al. patent is directed toward a method of transmitting a message from a source node to a destination node in a small, wireless network where each message has appended thereto concise network configuration data to eliminate need for routing protocols without adding significant overhead as described above. The Medin, Jr. patent is directed to a scalable, hierarchical distributed network architecture and processes for the delivery of high performance end-to-end online multimedia services as described above. Thus, the patents are directed toward diverging applications and there is no apparent reason, suggestion, or motivation to combine their teachings absent prohibited hindsight derived from Applicant's own disclosure. Accordingly, the proposed combination of the Stiller et al. and Medin, Jr. patents does not render the claimed invention obvious.

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The application, having been shown to overcome issues raised in the Office Action, is considered to be in condition for allowance and a Notice of Allowance is earnestly solicited.

Respectfully submitted,


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